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MACHINE TOOL FOR CENTRIFUGAL CASTING OF BEARINGS

Engr V. Perezkin

/Figures are appended./

The Central Design Bureau of the GARO Trust has worked out the design of a machine tool for the centrifugal casting of bearings for automobile engines.

The machine tool (Figure 1) consists of six basic units: cast-iron bed (1), machine-tool drive "variator" (5) for changing the number of revolutions of the machine-tool drive, electric motor (2) with bracket (3) for the foot pedal, chuck, and rod with pedal (4).

The spindle (3) (Figure 2) of the drive is fitted into supports (2) on ball bearings. At one end of the spindle there is a pulley (4) with a groove for the trapezoidal belt and on the other end of the spindle there is a chuck (1).

The chuck consists of aluminum disks and a spring. The spring serves to create the necessary tension for clamping the bearing. An adjusting nut is used to tighten the spring. The disks are separated by means of the foot pedal with rod and the releasing lever (5) (Figure 2) of the drive. The machine spindle is revolved by the electric motor through a belt drive. The electric motor is attached to the bed of the machine with pins. Between the electric motor and the bed there are three spacers, two having a thickness of 10 millimeters and one having a thickness of 5 millimeters, which adjust the belt tension.

A variator-reducer is installed for changing the number of revolutions of the machine-tool drive. The gear ratio of the reducer is adjusted by changing the distance between the axis of the reducer, the electric motor shaft, and the spindle, bringing about a displacement of the double pulley in the variator, and changing the gear ratio in the reducer.

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The table below gives the number of spindle revolutions according to the size of the bearing and composition of the babbitt:

Inside Diameter of Bearing (mm)	Spindle Revolutions of Machine-Tool Drive, mm [sic]	
	When Casting With Tin Babbitt	When Casting With Lead Babbitt
35	760	1,060
40	710	1,000
45	685	930
50	630	885
55	600	840
60	580	810
65	555	775
70	535	750
75	515	720
80	500	700

When establishing the number of spindle revolutions of the machine-tool drive, depending on the diameter of the bearing, the following formula can be used: $n = \frac{K}{\sqrt{r}}$ where K equals the constant coefficient, and r equals the inside diameter of bearing being cast, in centimeters.

According to the data of the Elektrosila Plant, the constant coefficient must be equal to 1,400 for babbitts with high lead content and 1,300 for tin babbitts.

The technical characteristics of the machine tool are as follows:

Type of machine tool--vertical stationary
Machine-tool drive--individual electric motor.
Power capacity of electric motor--1.3 kilowatts
Type of electric motor--alternating transformer current, 50 cycles per second, 127/220 and 220/380 volts, 1,420 rpm, with short-circuit armature.
Mechanical variator with double sliding (podvizhnym) pulley
Gear ratio of reducer--minimum, 0.35; maximum, 0.75
Number of spindle rpm--450-1,100
Drive from electric motor to reducer--belt
Chuck, disc spring with adjusting nut.
Release from 20 to 60 millimeters.
Releasing mechanism--foot pedal
Dimensions of machine tool--length, 715 millimeters, width, 565 millimeter, height, 1073 millimeters.
Weight of machine including electric motor--227 kilograms.

When casting bearings by the centrifugal method, it is necessary to maintain strictly the established technological conditions, particularly the speed of spindle rotation, temperature of flowing babbit, and time of casting.

This machine tool for centrifugal casting has been tested and approved for production at the Chistopol' Plant of the GARO Trust.

[Appended figures follow.]

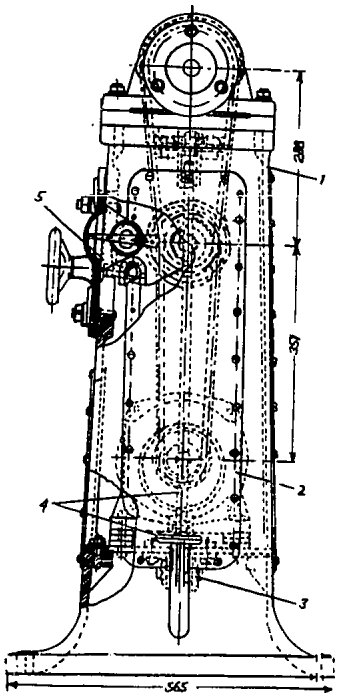

Figure 1. Side View of Machine Tool

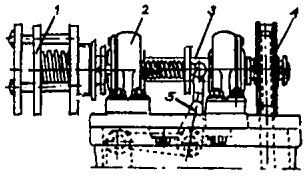

Figure 2. Machine-tool Drive with Chuck

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